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Investigating Nuclear Medicine Imagery

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In this activity, we suggest that the students research nuclear medicine imagery. If possible, have the students include the topics discussed in Module 1, 2, and 3.

Objectives:

- Compare and contrast differences between brain activity on SPECT images.
- Create a chart that discusses normal and abnormal brain SPECT imagery.

Discussion Questions:

- How do the most active areas in the brain compare with those least active?
- What is the difference between SPECT, CT Scan, and Radiation Therapy?
- How do the different parts of the brain affect human behavior?
- How can a SPECT image be used to diagnose a mental health disease?

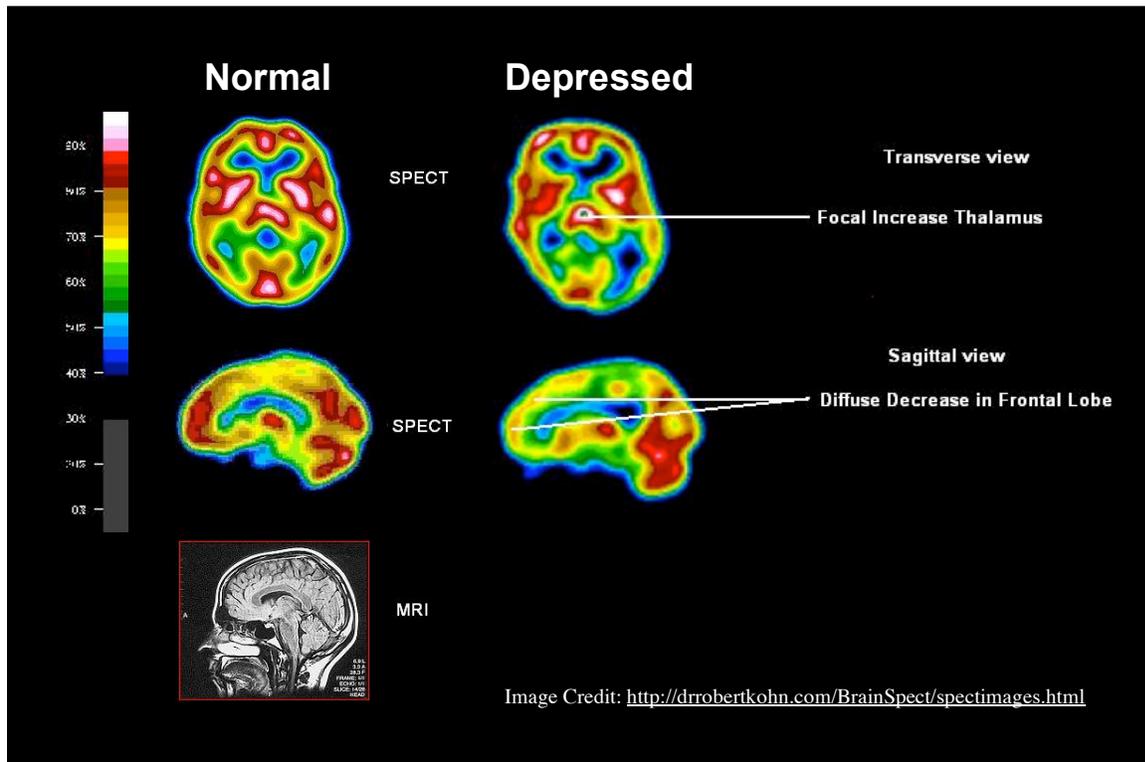
Research Question:

How can imagery of the human brain help a doctor to diagnose and treat brain disorders?

Methods:

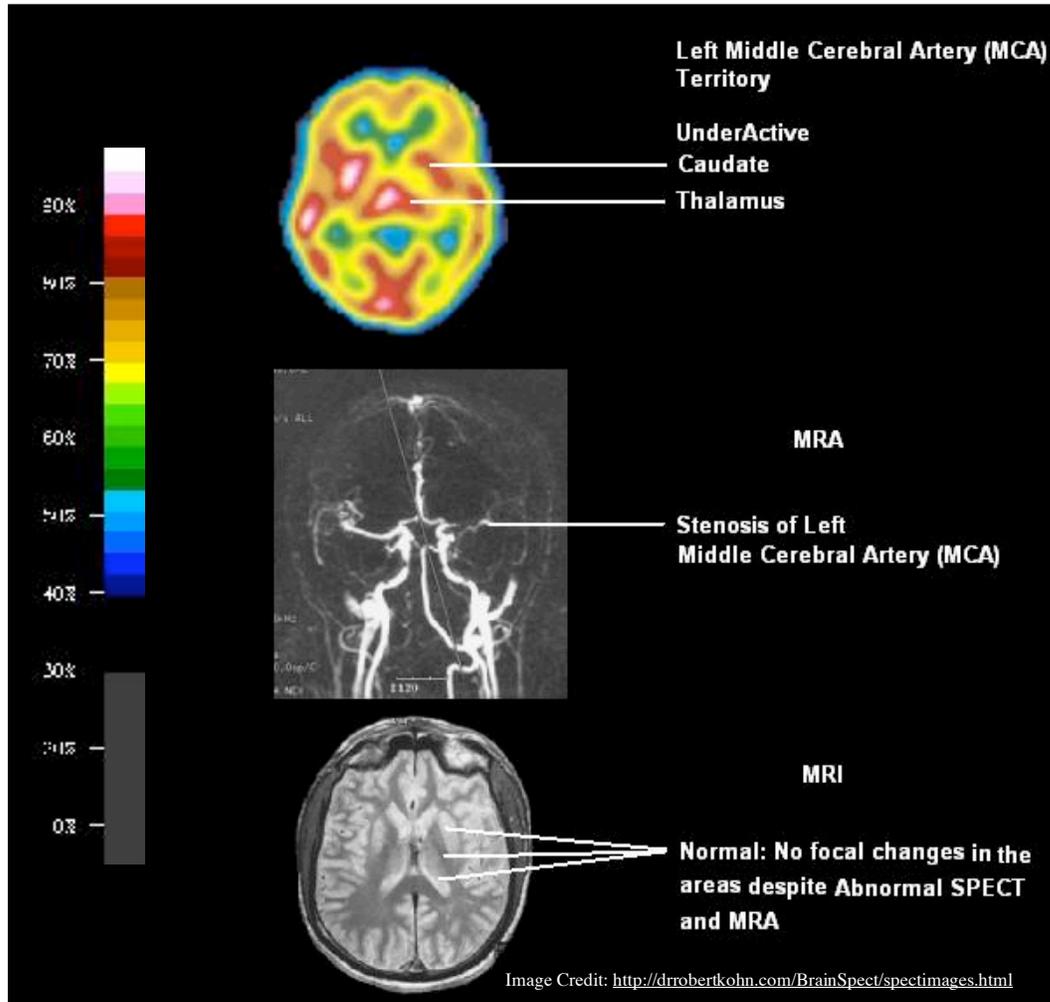
Have the students compare the images of normal brain activity with that of depressed (abnormal) brain activity (or other conditions) at the following website:

<http://drrobertkohn.com/BrainSpect/spectimages.html>



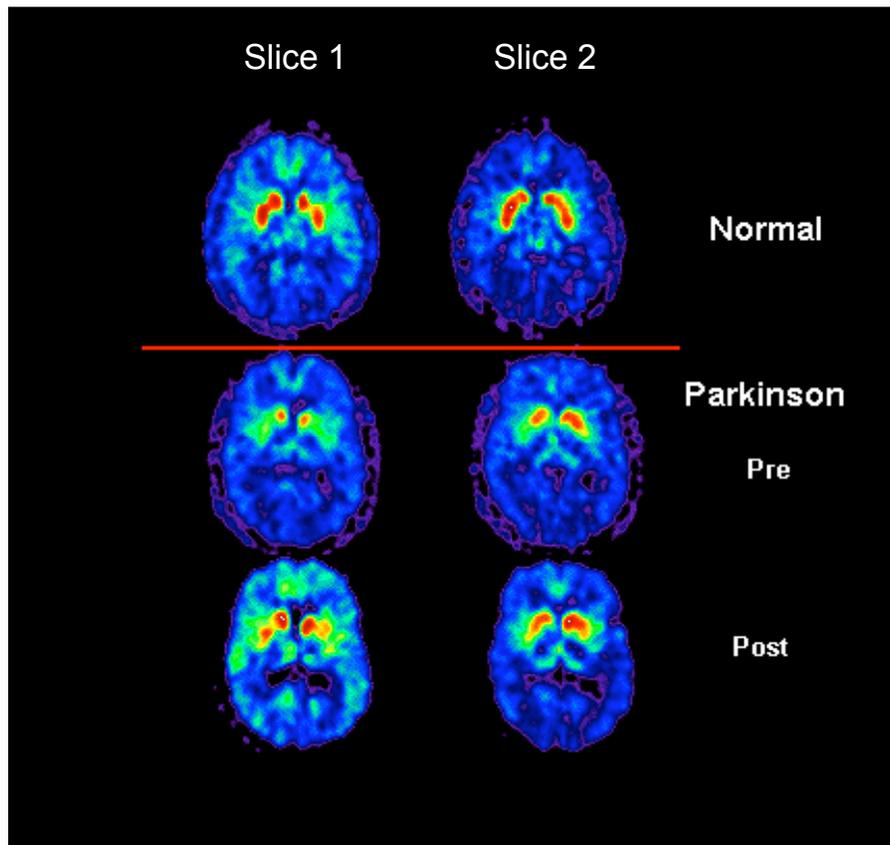
Additional Imagery from: <http://drrobertkohn.com/BrainSpect/SPECTscans/stroke.htm>

In this example, a patient has suffered a stroke. An MRI, a magnetic resonance angiogram (MRA), and a SPECT image of a patient's brain were used to diagnose the cause of the patient's symptoms. Notice that MRI did not show abnormalities, whereas the problems are more readily seen in the MRA and SPECT images.



Additional Images: from http://rst.gsfc.nasa.gov/Intro/Part2_26d.html

With this PET scan, you can show students how observing brain activity over time can aid a doctor in the diagnosis and treatment of disease. In this example, a patient diagnosed with Parkinson's Disease has responded favorably to treatment. Notice that the pre-treatment image slices along the same regions of the brain differ significantly as compared to those of a normal brain, whereas the post treatment images are similar to the normal brain images.



(Image credit: NASA)

References:

<http://drrobertkohn.com/BrainSpect/SPECTscans/Normtrans.htm>

Another website that provides students a tutorial on PET imagery can be found at:
http://science.education.nih.gov/supplements/nih2/addiction/activities/lesson1_analyzing2.htm

Tutorial of the long-term effects of drugs on the brain, with SPECT and PET imagery:
<http://science.education.nih.gov/supplements/nih2/addiction/activities/lesson4.htm>